

CLARK, LINCOLN, AND WHITE PINE COUNTIES  
GROUNDWATER DEVELOPMENT PROJECT EIS  
WATER RESOURCES TECHNICAL REVIEW  
MEETING 1 – BASELINE DATA

**CLARK, LINCOLN, AND WHITE PINE COUNTIES  
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June 23-24, 2005

Andrew Burns  
Southern Nevada Water Authority

**Overview**

- **BACKGROUND**
  - SNWA Water-Resource Portfolio
  - SNWA Groundwater Applications
- **PROJECT DESCRIPTION**
- **SNWA TECHNICAL STUDIES**
  - Previous Studies
  - Current Studies / Monitoring Programs
- **DATA SUBMITTAL**
- **QUESTIONS??**

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## **Southern Nevada Water Authority**

Established in 1991 for the purposes of:

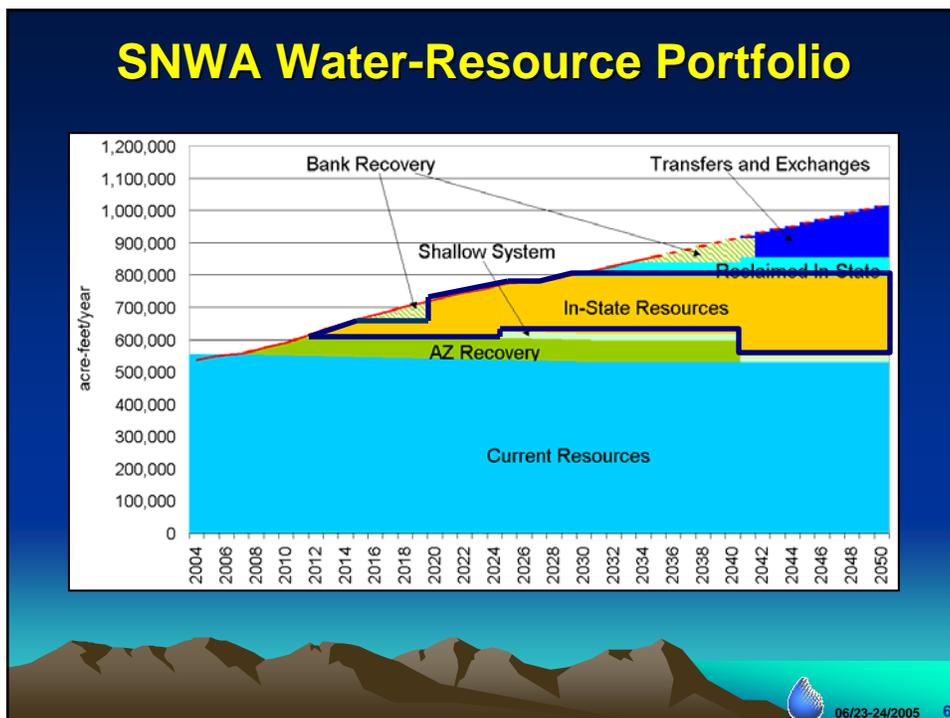
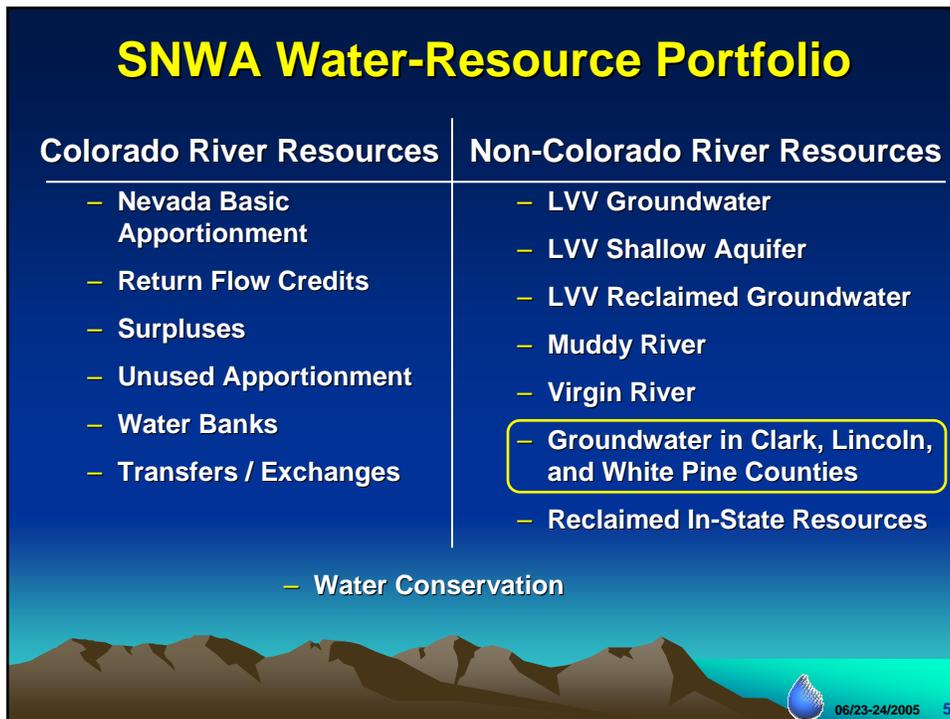
- Seeking new water resources for southern Nevada
- Managing existing and future water resources
- Constructing and managing regional water facilities
- Promoting responsible water conservation
- Presenting a unified position on water issues facing Southern Nevada

**Member Agencies:**

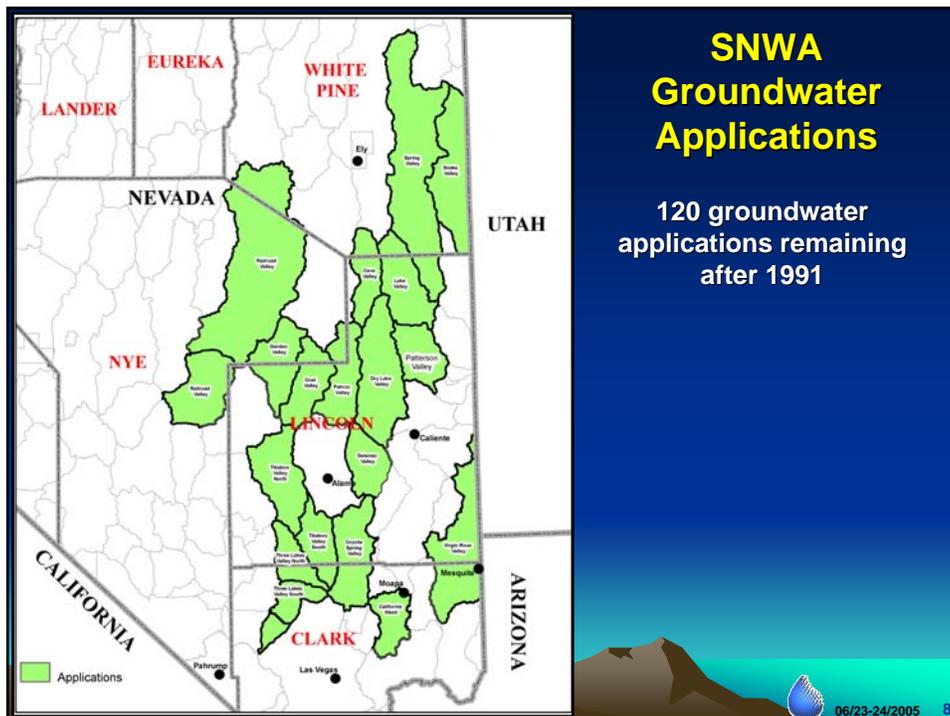
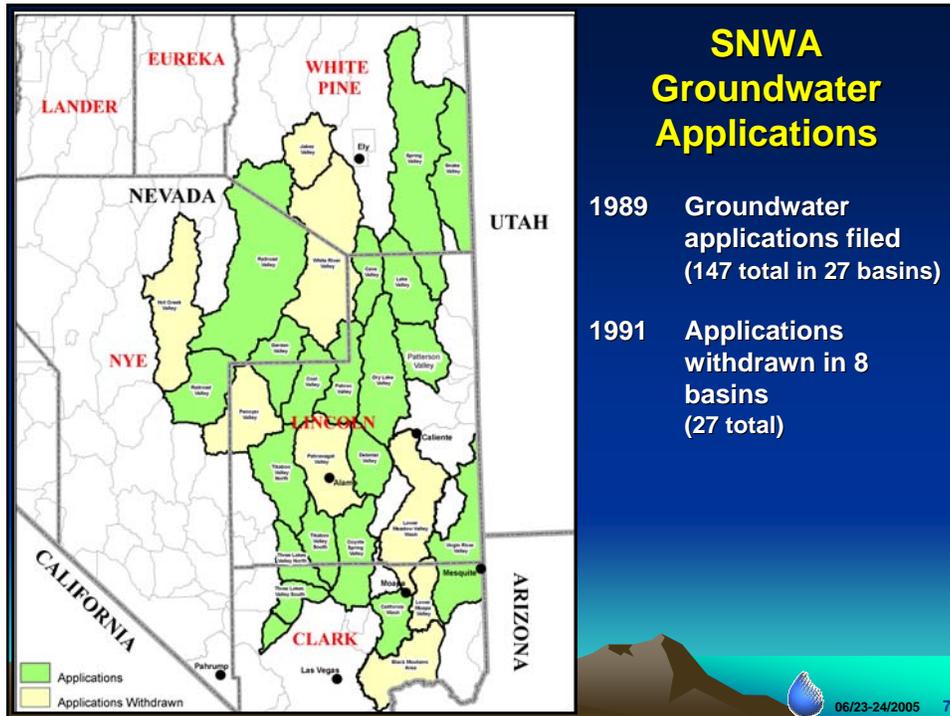
Big Bend Water District	City of Las Vegas
Boulder City	Las Vegas Valley Water District
City of North Las Vegas	Clark County Water Reclamation District
City of Henderson	

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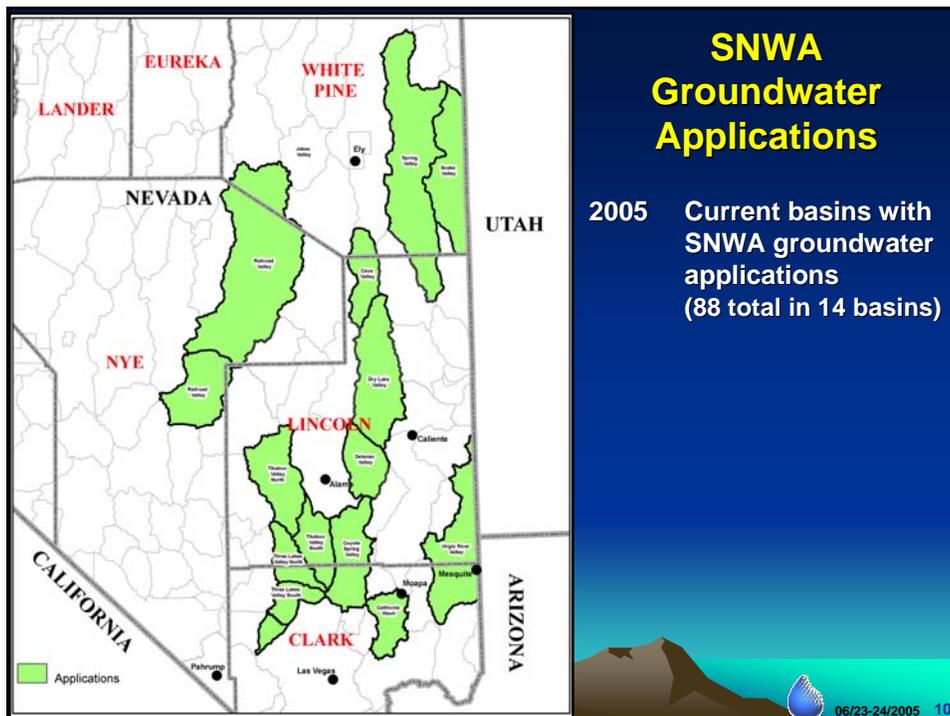
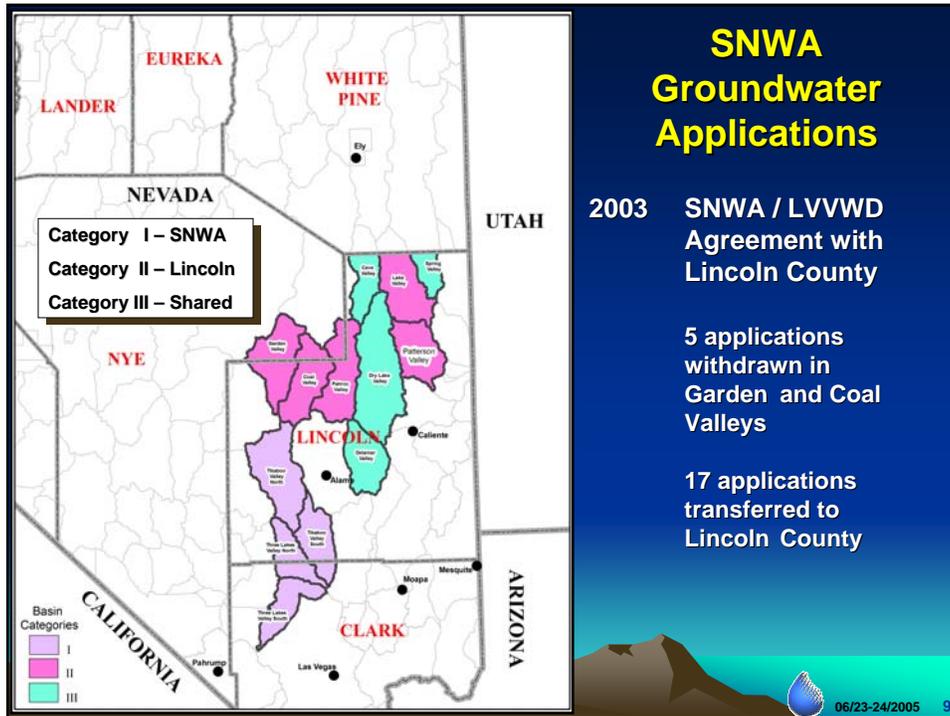
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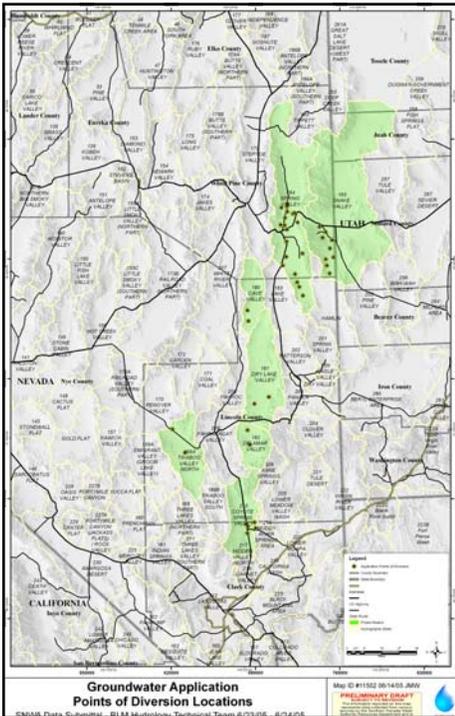


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**PROJECT DESCRIPTION...**



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**Project Basins**

41 Total number of active SNWA groundwater applications in Project Basins:

- Tikaboo North
- Coyote Spring
- Delamar
- Dry Lake
- Cave
- Spring
- Snake



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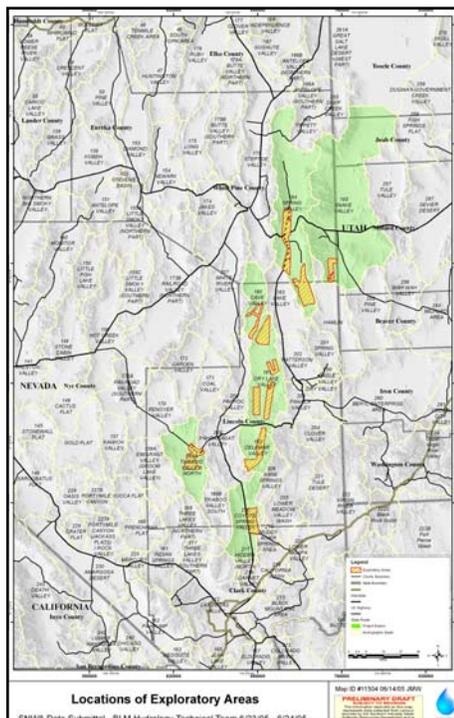
## Project Facilities

### Water Facilities

- 115 to 195 wells to produce up to 180,000 acre-feet per year
- 235 miles of 54 to 78 inch diameter buried main pipeline
- 110 miles of 24 to 36 inch diameter buried lateral pipeline
- 6 pumping stations (Coyote Spring, Tikaboo (2), Spring, Snake Valleys)
- 40-acre water treatment site in Apex area
- 20-million gallon reservoir in northeast Las Vegas Valley

### Power Facilities

- 250 miles of 230 kV overhead power line
- 95 miles of 69kV overhead power line
- 2 primary substations
- 2 hydro turbine energy recovery facilities (Dry Lake and Coyote Spring Valleys)



## Exploratory Areas

Areas within which production-well sites and well-field locations would be identified based on the results of an exploratory program that would include:

**detailed geophysical studies (gravity data, AMT)**

**exploratory-well drilling**

**aquifer testing and water-chemistry sampling**



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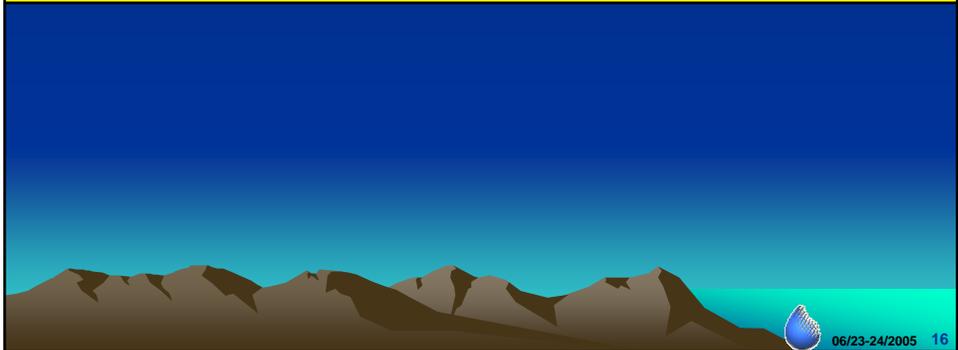
## Anticipated Project Schedule

Environmental review process	2005 - 2007
Exploratory well drilling, geotechnical, survey, and design	2007 - 2009
Primary pipeline construction in all segments except Snake and Tikaboo North Valleys	2009 - 2015
Pipeline construction in Snake Valley	2015 - 2018
Pipeline construction in Tikaboo Valley North	2019 - 2021



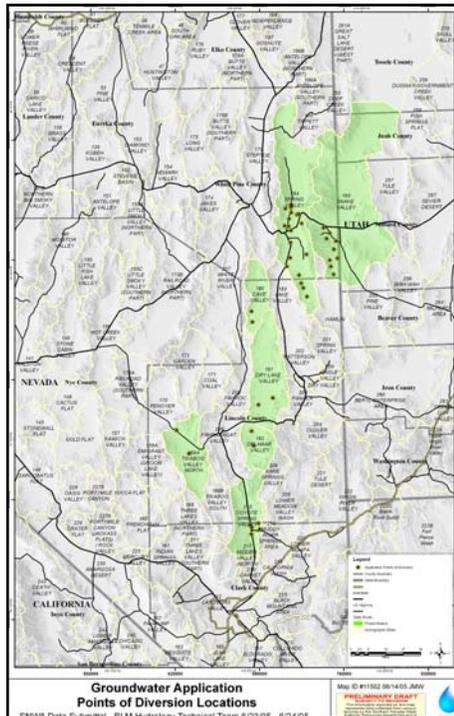
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## SNWA TECHNICAL STUDIES...



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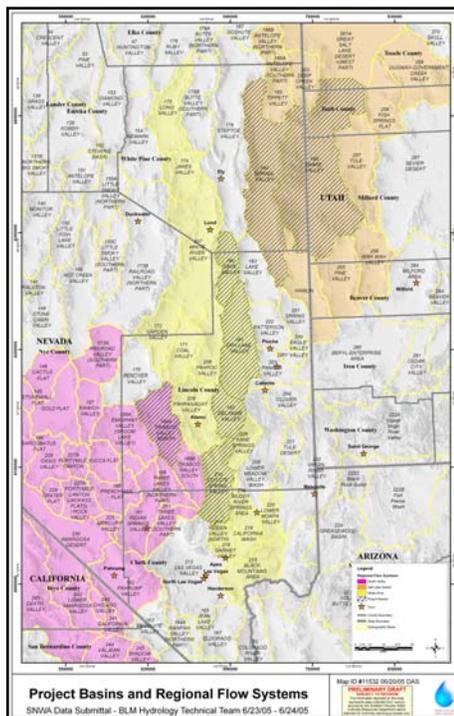
### Project Basins

41 Total number of active SNWA groundwater applications in Project Basins:

- Tikaboo North
- Coyote Spring
- Delamar
- Dry Lake
- Cave
- Spring
- Snake

Groundwater Application Points of Diversion Locations

Map ID #11132 06/23/05 DAD  
 PRELIMINARY DRAFT



### Project Basins and Regional Flow Systems

The Project Basins comprise portions of some regional groundwater flow systems:

#### Salt Lake Desert

- Spring
- Snake Valleys

#### White River

- Delamar
- Dry Lake
- Cave
- Coyote Spring

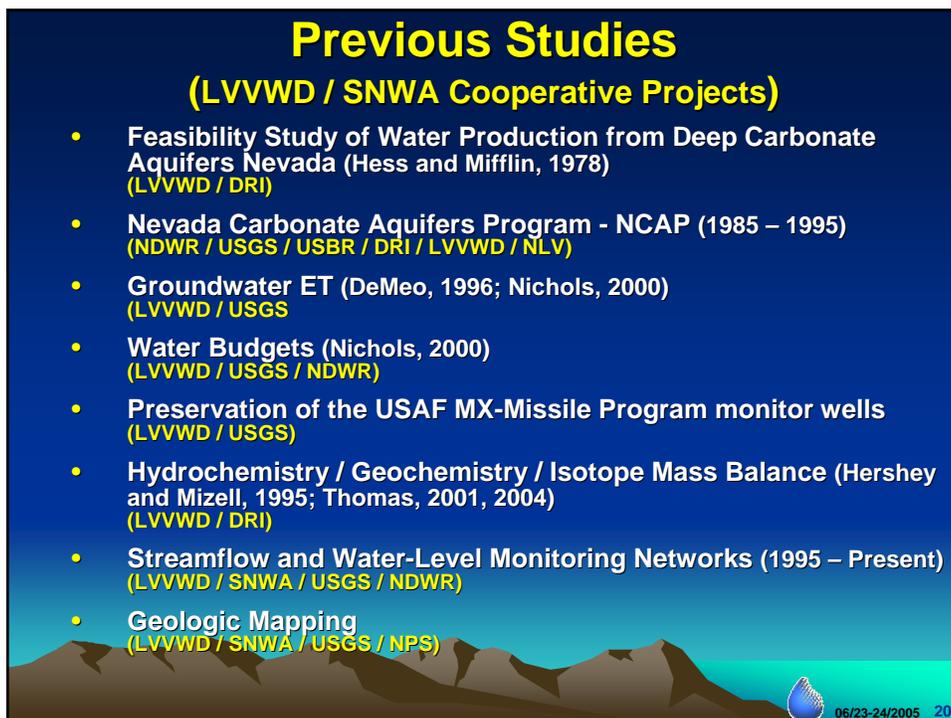
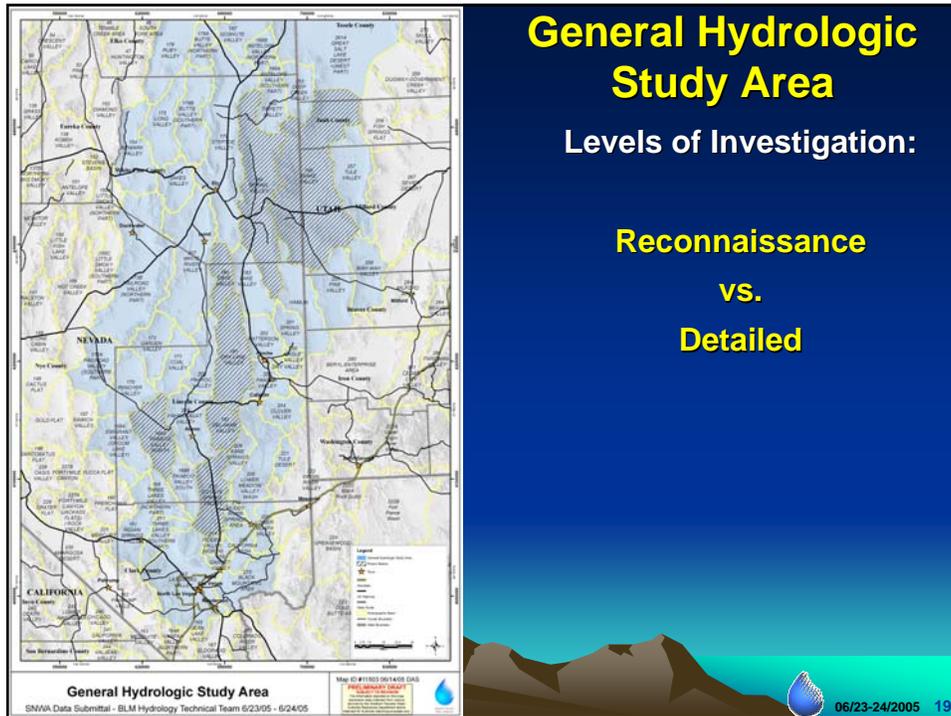
#### Death Valley

- Tikaboo North

Project Basins and Regional Flow Systems

Map ID #11132 06/23/05 DAD  
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## Previous LVVWD / SNWA Studies

- Cooperative Water Project (CWP) Report Series  
**Related Report Nos. 3, 6, 7, 8, 9, 10, 11, 13, 14, 16, 17**
- Water Resources and Ground-Water Modeling in the White River and Meadow Valley Wash Flow Systems (LVVWD, 2001)
- Survey of groundwater and surface-water monitoring sites (SNWA, 2003 and 2005)
- Surface Water Resources and Basin Water Budget for Spring Valley, White Pine and Lincoln Counties (LVVWD, 2003)



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## Other Relevant Studies

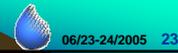
- NDWR / USGS Reconnaissance Report Series
- USAF MX Siting Investigation / Water Resources Program
- NDWR Nevada's Water Resources Report Series
- USGS Regional Aquifer System Analysis (RASA)
- NBMG Geologic Mapping (county maps)
- USGS Geologic Mapping
- NBMG Oil and Gas Well Databases



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## CURRENT SNWA EFFORTS...

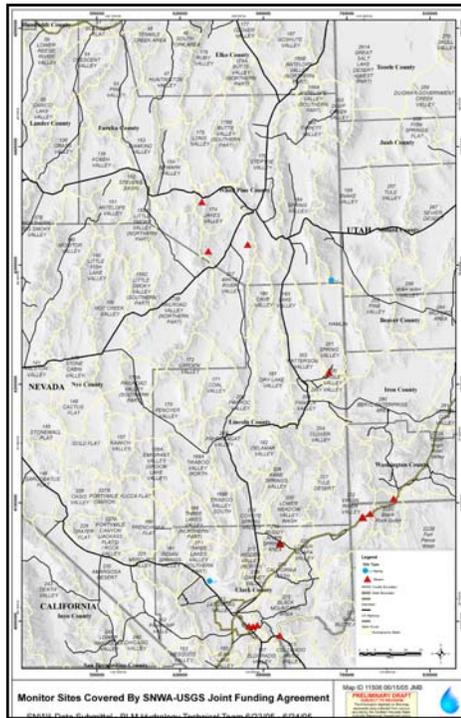


## Data Collection / Compilation Efforts

- Joint Funding Agreements – Hydrologic Monitoring  
(USGS / SNWA / LVVWD / NDWR)
- SNWA data collection
  - SE Order 1169 study
  - Groundwater development project
- DRI water-chemistry sampling
- UNR ET / weather-station data / SNWA Vegetation Mapping
- Joint Funding Agreements – Geophysical Surveys  
(USGS (GUMP) / SNWA)



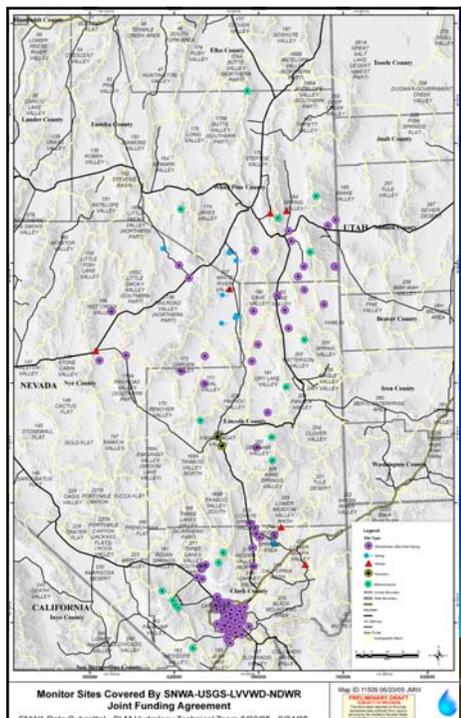
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**JFA - Hydrologic Monitoring**  
(USGS / SNWA)

- 1985 Start of Program  
(new JFA each year)
- 19 Surface Water Sites  
O&M of Streamflow Sites
- 3 WQ Sampling Sites
- 1 USGS OFR Muddy Springs  
Report

Monitor Sites Covered By SNWA-USGS Joint Funding Agreement



**JFA - Hydrologic Monitoring**  
(USGS / NDWR / LVVWD - SNWA)

- 1985 Start of Program  
(new JFA each year)
- 103 Groundwater Sites
  - 13 Continuous WL Monitoring
  - 63 Quarterly DTW (LVV)
  - 27 Quarterly DTW (Carbonate)
- 32 Surface Water Sites
  - 9 O&M of Streamflow Sites
  - 22 Biannual Measurements
  - 1 Publication of LVVWD Gage  
Data
- 17 High-Altitude Precip. Gages

Monitor Sites Covered By SNWA-USGS-LVVWD-NDWR  
Joint Funding Agreement



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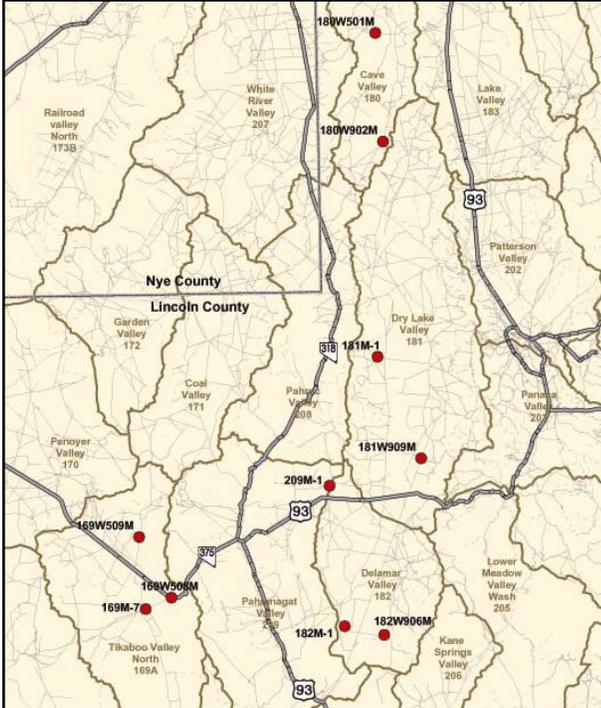
**Depth-to-Water Measurements  
(Dry Lake MX, Dry Lake Valley)**



SNWA Data Collection

- Site Inventory
- Depth-to-Water Measurements
- Stream Discharge Measurements
- Spring Discharge Measurements
- Water-Chemistry / Isotope Sampling (wells, streams, springs)


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Monitor-Well Drilling Program

Cave  
 Dry  
 Delamar  
 Tikaboo North

10 Wells

- 4 carbonate
- 4 alluvial
- 2 volcanic

TD 1,100 – 2,340 ft

- 7 6" completions
- 3 12" completions


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### Monitor-Well Drilling Program (status as of 06/15/05)

Location	HA	Depth Drilled (ft)	Rock Type	DTW Date	DTW (ft) <sup>11</sup>
181M-1	181	1,430	carbonate	06/09/05	677
181W909M	181	1,320	alluvium	04/30/05	525
182M-1	182	1,320	volcanic	02/21/05	825
182W906M	182	1,640	volcanic		
209M-1	209	940	carbonate		
180W501M	180				
180W902M	180				
169M-7	169				
169W508M	169				
169W509M	169				

<sup>11</sup> DTW measurements reported during drilling

**PRELIMINARY DATA ONLY – SUBJECT TO CHANGE**



### UNR / SNWA Phreatophyte Mapping and ET Measurements



Mapping completed by SNWA during 2004 – 2005

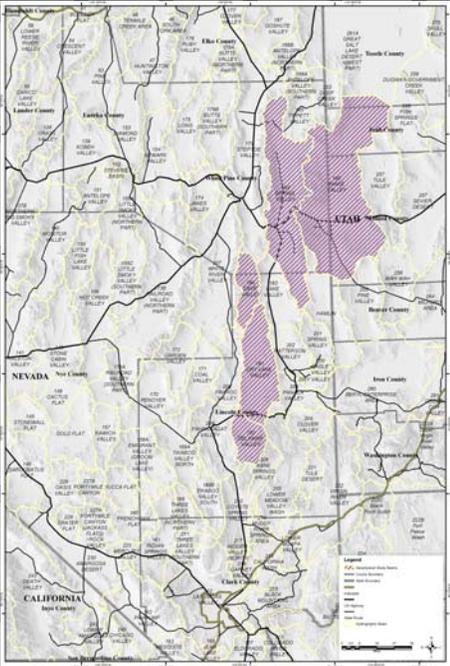
Estimate / Measure ET rates at selected sites in White River and Spring Valleys

- 2 eddy covariance flux systems
- 2 stationary weather stations

Estimate annual ET in White River and Spring Valleys using measured ET and remote-sensing techniques



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**JFA – Geophysical Studies**  
(USGS GUMP / SNWA)

USGS Geophysical Unit Menlo Park completing gravity Studies in

- Delamar
- Dry
- Cave
- Spring
- Snake

Compilation and qualification of existing gravity-station data

Collection of additional gravity data

Data analysis and interpretation (depth-to-basement / valley fill thickness)

Audiomagnetotelluric (AMT) Studies In Spring Valley

Basins with JFA Geophysical Studies

Map ID #11524 06/23/05 AMT  
PRELIMINARY DRAFT

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**DATA SUBMITTAL...**

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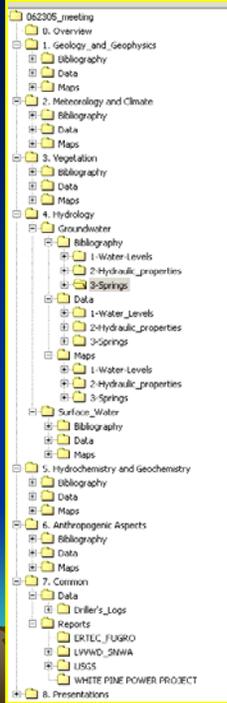
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## Data Submittal Package

- **Organized by subject matter and agenda items**
  - Geology / Geophysics
  - Meteorology and Climate
  - Vegetation
  - Hydrology
  - Hydrochemistry / Geochemistry
  - Anthropogenic Aspects
  
- **Material available on DVD**
  - Presentations
  - Data files
  - Selected data reports
  - Reference material



## DVD Folder Structure



- **Subfolders**
  - Bibliography
  - Data
  - Maps
  
- **Common Folder**
  - Data
  - Reports
  
- **Presentations**



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## GIS Data Sets

Due to the size of GIS (Geographical Information Systems) data sets, Southern Nevada Water Authority (SNWA) is providing GIS data in a separate format.

For those with ESRI's ArcGIS 9.0 software, an ArcIMS map service has been created by SNWA that includes the GIS data. For those without the appropriate software, an Internet-based GIS data viewer has been created by SNWA and may be accessed using Internet Explorer.

For access to the map service or the viewer, please provide your name, agency, address, e-mail address and phone number along with the type of access you require to:

Lisa Atwood  
Data Resources Analyst  
Southern Nevada Water Authority  
1900 E. Flamingo Road  
Las Vegas, NV 89119  
(702) 862-3790  
lisa.atwood@snwa.com



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## SNWA Data Presentations

- **Description of SNWA data compilation and collection efforts**
  - Data types, methods of measurement, data sources, spatial distribution
- **General data observations**
- **DVD contents**

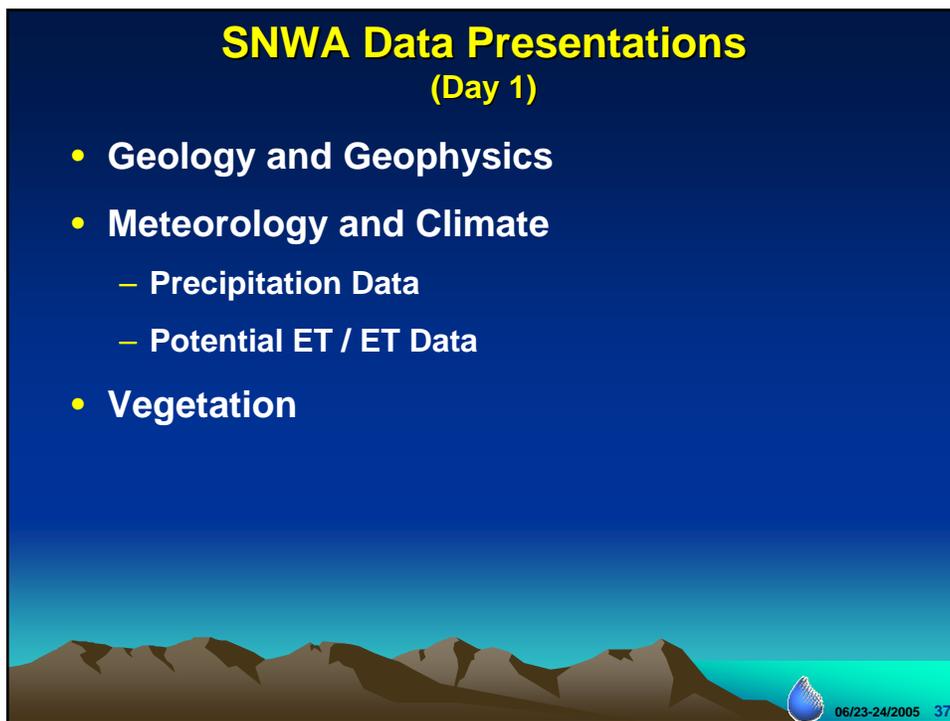


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### **SNWA Data Presentations** (Day 1)

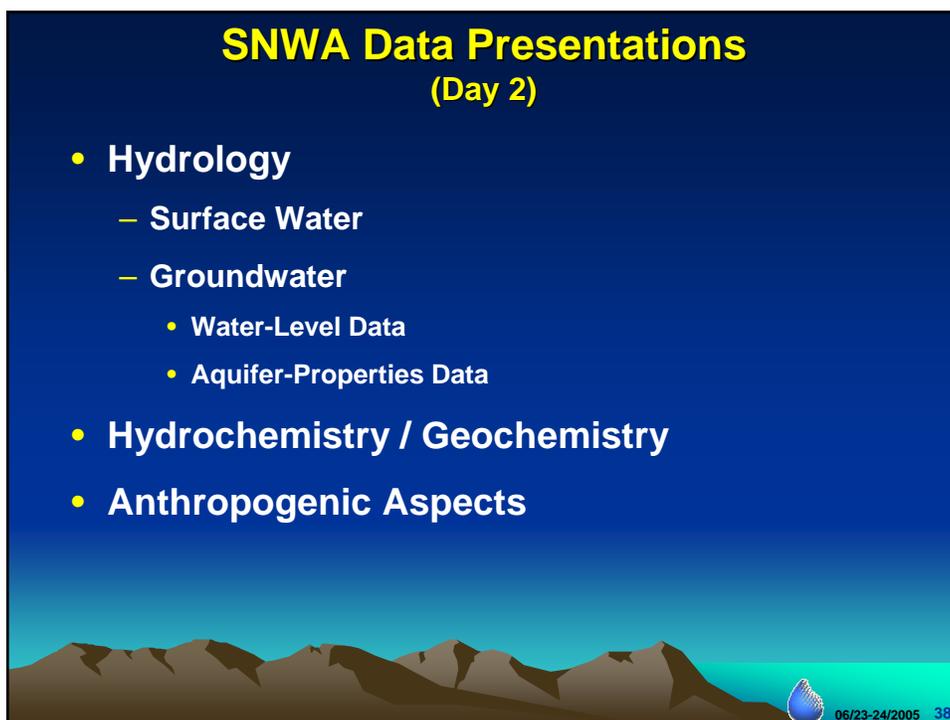
- **Geology and Geophysics**
- **Meteorology and Climate**
  - Precipitation Data
  - Potential ET / ET Data
- **Vegetation**



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### **SNWA Data Presentations** (Day 2)

- **Hydrology**
  - Surface Water
  - Groundwater
    - Water-Level Data
    - Aquifer-Properties Data
- **Hydrochemistry / Geochemistry**
- **Anthropogenic Aspects**



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